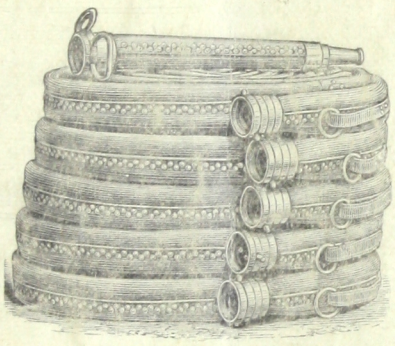
FIRE



HOSE.

FIRE HOSE.

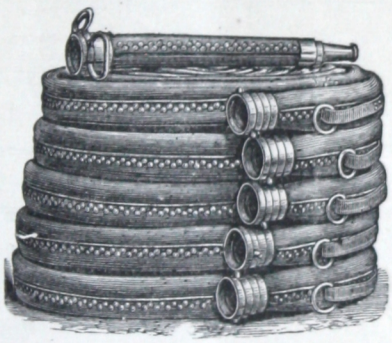
A TREATISE

ON THE

IMPORTANCE OF THE BEST HOSE

TO THE

FIRE SERVICE OF THE COUNTRY.



THE DURABILITY, RELIABILITY,

Wearing Qualities, Strength and Economy

—OF—

The Different Kinds of Fire Hose

FULLY DEMONSTRATED.

PUBLISHED BY

SAMUEL EASTMAN & CO.,

CONCORD, N. H.

1883.

INTRODUCTION.

As we are constantly in receipt of numerous enquiries from fire departments and corporations, asking the merits of our Standard Oak Leather Hose, and our claims as to its comparative worth to other kinds of fire hose, we take pleasure in presenting to you this pamphlet which we trust will be more acceptable than any single letter would prove. Its subject is of vital importance to every community, and it deserves and will doubtless receive a careful perusal. We profess nothing but a candid statement of facts, which are unanswerable. We begin with the invention of flexible fire hose and follow its progress to the present time, stating the true substances which compose the different kinds of fire hose, and the adaptability of each, on its own merit, to the needs of the fire service.

Thanking the public for its many favors of the past, and trusting to merit in the future the same confidence we have heretofore enjoyed, we present this pamphlet in the hope that it may introduce us to many new friends, who may thus have the opportunity of discovering, what our old friends have already proven, that our work fulfills our motto, which is, "Not how cheap, but how good."

SAMUEL EASTMAN & CO.,

CONCORD, N. H.

THE INVENTION OF FLEXIBLE HOSE

Belongs to comparatively modern times, and comes to us from the land of dykes and windmills. History positively records its invention in 1672, by John and Nicholas Van-der-Heide, inspectors of fire apparatus in the city of Amsterdam. It was made in fifty-foot lengths, coupled together with brass screws; and as leather and fabric were both used in its manufacture, the two species of hose thus became twin in birth.

The record tells us that in the manufacture of this fire-hose, invented by the Van-der-Heides, leather, sail-cloth, and seamless fabric covered with cement or paint was used. Thus does history ruthlessly destroy the delightful delusion fondly embraced, that fabric fire-hose bears no taint of the mustiness of age, and is the offspring of "modern ideas" and "progress." Again, the record tells us that though leather hose was very defective, from the fact that it was sewn together like a boot-leg, it rendered such satisfactory service that it soon supplanted the sail-cloth and seamless woven substitutes which invariably gave way before hard usage. Says Mr. C. C. Hine, in a history of fire-engines, in a work entitled "Fighting Fire,"—

"Some sorts of hose were made of canvas covered with a cement or paint to make them water-tight; another sort was the seamless hose woven in tubular form by machines, such as has been introduced at a very recent period as a new invention; but leather still continued to be used with such satisfactory results as to prove the truth of the old proverb, that "There's nothing like leather."

The introduction of flexible hose revolutionized the fighting of fires, and marked the opening of a new era in the fire service. In 1808 the invention of copper-riveted-leather-fire-hose, by Messrs. Sellers and Pennock, of Philadelphia, inaugurated the second era, and constituted leather hose, in its incomparable durability, reliability, and strength, an American institution.

FIRE HOSE.

In the purchase of Fire Hose nothing but the best should receive any consideration. Life and property of whole communities are too much at stake to select anything that might prove inferior.

Let us look to the materials which make our modern Fire Hose, and consider their merits in the most intelligent manner, and see what materials are best adapted for our individual departments.

In the purchase of Fire Hose in cities of from thirty to one hundred thousand population, the life of hose is expected to extend over a period of from fifteen to twenty years, so that a selection looking to true economy, is its probable lasting qualities.

Fire Hose at the present time, is made either of Leather and Copper or Cotton and Rubber. *That* hose is best which combines the most essential requisites that Fire Hose should possess, viz: Durability, Reliability, Strength, Wearing qualities, Repairs, Ease of handling, Care and Cost. The materials which excel in these respects should be entitled to the preference.

The most important matter then to consider is

DURABILITY AND RELIABILITY.

Leather has never been excelled by any other substance for any use to which it has been applied. Even in the present days of progress and invention, no substitute has been found for it.

Leather can be piled up in a store-house same as lumber, kept there for an indefinite time and retain all its lasting qualities. When finished or curried with best oil and tallow as for hose, and packed away, its fiber grows finer, closer, stronger and more pliable, for a certain time and there it remains. Fire Hose when received fresh from the factory, may be placed upon a reel or in a pile and at the end of five years by actual experiment is found to be twenty per cent stronger than when first manufactured, and if kept in this way must by necessity, in twenty years be as strong as when first made. *These are facts which cannot be controverted.*

But it may be said that hose is not bought to be laid away. This, to a certain extent, is true, but all departments should have a reserve of hose more than is needed for ordinary fires, to fall back upon in cases of unexpected emergencies.

Cotton, if put away unused, may also bear storage without harm, but when manufactured into Fire Hose, it depends entirely upon rubber for its usefulness which changes the character or durability

of the cotton. Rubber, when prepared for use, begins to decay the moment it is made, and when combined with cloth it imparts a portion of its power of decay to the cloth. Every dealer in rubber goods will tell you that he is forced to make it a point to keep his stock fresh.

The best manufactured rubber in any form, as is seen in rubber bands, congress shoes, suspenders, &c., or the rubber in Fire Hose, carry the seeds of their own destruction, and have a life of but from two to three years at most. For reserve hose then, the cotton and rubber is almost worthless, on account of its lack of durability, while the leather is permanent and trustworthy.

STRENGTH AND WEARING QUALITIES.

Since leather must be conceded as best for reserve hose, what then are its merits, for daily use and abuse? This is shown by the thousands of uses to which it is put. Take for example, the thoroughbraces of a coach and can a severer test for any material be found? The leather braces sustain the whole weight of the coach, which is often loaded to its utmost capacity, driven over the roughest of country or mountain roads, tossed into every position and used year after year, in heat and cold, sleet and rains, mud and dust, the least cared for and the last to give out, often doing duty more than thirty years and outlasting the vehicle itself.

That leather must be *actually worn out* by hard use, is shown daily in our cities—in harnesses where the veterans are still at work and trustworthy after more than twenty year's service. Age rots the fabric seam in a boot or harness when unused, but the leather is as strong as ever. A shoe dealer finds no deterioration in the actual leather material, but, on the contrary, the leather in a boot improves by age. The process of tanning preserves it from decay.

Since leather possesses durability, reliability and strength, let us consider the importance of the latter in the use of Fire Hose. It has been found in all our largest cities, that a pressure of seventy to ninety pounds to the square inch constantly maintained on the hose by the steamer, is best for all fire duty. In rare cases on long lines or very high buildings, this pressure may be increased from ten to twenty-five pounds. A greater pressure can not be safely and well managed by the firemen. This is well proven by the Holly system of water works, which rarely exceeds the last named pressure for any fire duty and also where the reservoir or gravity power is used or its equivalent of two hun-

dred to two hundred and fifty feet head. If a large stream is required, from one and three-fourths to two-inch nozzles, requiring two or more steamers working into one line of hose, the volume of water passing through the hose is greatly increased, but the same pressure is maintained. As all leather hose is warranted to stand, under any and all circumstances, a direct head of four hundred feet (and we *guarantee our Standard Hose for over five hundred feet*) is not leather ample in strength for all fire duty? The question then to be considered is what material will prove the most reliable in ten, fifteen or twenty years hence, as any fire hose manufactured, when new, is capable of withstanding more than double any duty required, but the *wearing* and *lasting qualities* are most essential.

Notice how the leather in that part of the harness that holds the thills becomes glazed and smooth, and wears out the finest hickory of the shaft. So also will a leather trace outlast several iron trace chains, while on the other hand cotton will not endure rough usage. It is easily frayed by contact with rough surfaces in the street. A sharp edge over which it may be drawn will inflict ruinous injury at the most important time.

REPAIRS.

The repair of hose is an essential feature, because of its great liability to injury by being dragged over the *debris* of burning buildings, in contact with hot and burning embers, and by the constant motion from the action of the pumps. Leather hose can be easily and cheaply repaired, and made as good as any part.

Fabric hose can only be repaired by cutting out the injured part and putting in a new coupling, or some costly device. It is claimed it can be re-knitted and the rubber lining put back under the damaged place, but the fact is, it proves to be at the cost of the section.

EASE OF HANDLING.

In handling hose, in weight, leather occupies a medium between the different kinds of rubber and cotton, or cloth. Our Standard Hose *has seven permanent handles attached to each fifty foot* section, while all kinds made from cotton or rubber have none. Now suppose three lines of hose are lying in a muddy street, one leather and the other two rubber and cloth, which will the firemen select

to move? Will it not be the one with handles, which they can easily catch hold of with one hand, rather than those which must be grasped with both hands? The one with handles can be moved with ease about the streets, or taken up ladders more easily and will soil the clothes of the firemen less than any make without handles. A permanent handle on a pail or basket proves a convenience as well as a necessity.

As regards dirt, leather hose is likely to be as clean as the cloth. If soiled the leather is easily cleaned, while the cloth requires more labor. Soiled boots are always more easily cleaned than pantaloons after a walk in the mud.

It is said "Leather sweats." It does. At every conflagration, more or less hose is exposed to the destroying effects of fire. This is especially true at extensive conflagrations. Heat from the steamer assails it; showers of sparks fall upon it; it is stretched over burning embers and hot pavements and often buried beneath hot ruins. To safely withstand this ordeal, that very defect of sweat proves a virtue, preserving, as it does, the very life of the hose. Surely, then, we have here an attribute in which leather excels, while cotton must be constantly watched under such circumstances.

CARE

Also has a direct influence on the life of all materials. They can be used or abused. In a large number of the fire departments in the United States only one line of leather hose is owned, and it is reeled up as it comes from the fire, wet, and there it remains to dry out as best it can. Hose is found in this condition in many of our large cities in the middle states. Leather under such circumstances has an average life of 15 years, and if cared for would last at least 50 per cent longer. On the other hand cotton hose must be dried. One fabric hose circular, on the "care of hose" says "our hose requires only the ordinary care, that is given to other apparatus, simply to be *dried* if you are indifferent to its appearance, or washed and dried if otherwise; but *it must be dried* without delay or *it will surely rot.*" Various devices have been tried to prevent rot and mildew, but without effect. Cotton is a vegetable product and is quick to decay when exposed to moisture. Each new kind of fabric hose now claims to be treated by some new process which makes it sure mildew and rot proof, or has some peculiar stitch, but rot and mildew will affect one stitch as readily as another. No sea captain or

sailor has yet found anything to prevent the mildewing of cotton sails.

The materials of which rubber and cotton hose is made cause certain and sure destruction. The rubber begins to decay as soon as manufactured and the injurious moisture and acid, generated in the process of manufacture, eat up the life of the duck. In fabric or cloth hose the moisture works beneath the lining and mildew and rot begin while apparently the outside is dry. Any rubber cloth in any form soon loses its life and strength.

Again all fabric hose elongates from one to four feet to a section when under pressure. This soon cracks the rubber lining and causes the hose to leak. So, also, do any defects, or so called "pin holes" in the rubber lining of the hose, or the rubber cracking when the hose is doubled up and laying on the reels. The moisture getting behind the rubber makes it the same as a rubber boot to dry, so that it is readily seen that the materials used and combined in cotton and rubber hose in any form, are defective and for the uses of Fire Hose, must soon at best prove utterly worthless, while leather and copper will prove reliable after many years of hard use and abuse. The materials used in the construction of leather hose are antiseptic and lasting and *will not deteriorate except when in actual service.*

The natural life for leather hose in *service* in our larger departments is from fifteen to twenty years; in smaller departments in proportion to its use, while that of any rubber or fabric hose does not extend beyond three years. Copper, the only substance except leather used in the manufacture of leather hose, is one of the most indestructible of metals.

COMPARATIVE COST.

The first cost of cotton, fabric or cloth hose, in any form with rubber, is much less than that of leather. Its great merit claimed by its inventors is, that it is a substitute for leather at less cost. In fact there is no genuine substitute for leather, *that can be bought at any price.* Leather possesses innate qualities that are found in no other substance. Any alleged substitutes for leather are but inferior articles that involve far less value and intrinsic worth.

We will call the life of leather eighteen years, and the other three years and compare the relative cost of one thousand feet. Leather complete at $1.20 per foot, $1,200 00

As our hose leaves the factory fresh oiled on inside and ready for several years use, we will add for oiling four times during its eighteen years, at a cost of thirty to forty cents per one hundred feet, including labor = $4.00 per one thousand feet = four times $16.00

Total cost, $1,216 00

Less value of copper and old leather hose, when condemned for fire duty, which has a cash market value which averages 14 cents per foot or more, $140 00

Total net cost, $1,076 00

Or an average of less than $60.00 per year on each one thousand feet of leather used in all fire service to a department.

The best makes of cotton or cloth and rubber hose three and four ply complete, say 85 cents per foot, $850.00. *No value when condemned.* Average cost per year, $283.00 on each one thousand feet of hose or an annual cost to a Department of nearly five times that of leather hose, or a net gain by using leather hose of $223.00 a year on each one thousand feet, although the first cost of the leather has been taken at 40 per cent higher cost at first purchase, while all leather hose that is held as reserve hose is at no expense, or deterioration. It is an investment worth at least the market value of new at any time.

The above are facts which are the inherent qualities that leather and copper possess.

EXPERIMENTS.

If the claims of cloth and rubber hose are valid, then the leather industry would have been annihilated years ago, for in the past twenty years more than one hundred patents have been taken out combining cloth and rubber in some form, for fire hose. If the material composed of cotton and rubber has more strength and lasting qualities than leather, it should have long ago

been introduced into heavy team harnesses, which are exposed to mud, rain and hard usage.

As a substitute for leather it has proved a failure in every instance, on account of both materials being defective for the purposes to which it is put, viz: The rubber having but a short life at the best; its action on the fabric; its worthlessness without the rubber for a fire hose and the liability of the cotton to rot and mildew when saturated with water. Can any city afford to select any inferior substance to be placed in Fire Hose on the pretext of its first cost being less? Can it afford to take an *inferior* substance in Fire Hose even *as a gift?*

We are often asked why are fire departments now so anxious to replace their different kinds of cloth and rubber hose, for leather, and why were they willing to experiment with such an inferior substance in every essential which fire hose should possess? Let us ask a question. Why, a few years ago, was wood pavement preferred to stone? Yet no one now doubts the superiority of the stone.

If a mania should be brought about to replace all leather harness with a cloth and rubber article, no sensible leather manufacturer would abandon the leather product, for his judgment and knowledge of the two substances would at once tell him that cotton could only be a temporary experiment. The true worth of a manufactured article must depend upon the substance used in its composition.

To induce Cities to experiment further in rubber and cloth hose, great inducements are held out and guarantees are given covering a long term of years.

On this subject we will quote from an editorial in the "Fireman's Journal" of May 6th, 1882, page 346—

"BUYING AND SELLING FIRE HOSE.

"Manufacturers are energetic in pushing their respective makes of hose, and each claims superiority of construction over the goods of his competitors, but such claim is usually based upon durability, for nearly every brand we know of is equal to resisting any pressure liable to be used in actual service. In selecting hose, therefore, the purchaser is called upon to determine which of all the samples offered for his consideration is likely to prove serviceable for the longest time. This question of durability has led to the practice on the part of manufacturers of guaranteeing their goods for a certain number of years. When this practice first came into vogue, it was generally customary to guarantee hose sold for three years against the ordinary wear and tear of the fire service, the

manufacturer contracting to replace any lengths that failed within that time in consequence of any defect in its construction. But the excessive competition that characterizes the sale of fire hose soon led to more sweeping guarantees of durability. One agent who offered to insure his goods for three years was outbid by another, who would see his three years and raise him six months better. So it went on, the guarantee being extended, according to the degree of competition, to four, five or six years, and we have heard of instances of cotton hose being guaranteed for nine years. Now, as cotton hose has nowhere made a record to exceed about one-half this length of time, such a guarantee could only have been given out of a spirit of speculation or bravado, having no basis of facts on which to rest. If a city, after purchasing hose, should ask an insurance company to insure it against all contingencies for a certain number of years, it would have to pay a very handsome premium. There is no more reason for their guaranteeing their goods than for a tailor to guarantee every suit of clothes he sells, or for a national bank to certify that its notes are good for their face value. When they consent to insure them against all the accidents incident to the fire service, they assume a responsibility that leads to endless misunderstandings, misrepresentations, and more or less fraud."

Could an article to be purchased be subject to so many contingencies as Fire Hose? and if it is subject to contingencies, what is the value of a guaranty to a city?

Should not Fire Hose be bought and sold on its merits, the same as other goods, considering the material of which it is composed and the purpose for which it is intended, or is it to be bartered the same as cough and patent medicines?

Leather and copper carry in themselves a certain and sure guaranty. Any expert of leather can tell its true quality as easily as a bank cashier can discover a spurious bill.

We might go on showing the durability of leather for hard use and abuse to have never been excelled in any calling it has been asked to fill. Factories are numerous that are now running with leather belting, trustworthy and reliable, that has been in constant use thirty and forty years, while leather in this class of goods, for durability stands to a disadvantage compared to leather in hose, for in belting its durability largely depends on glue in its manufacture, while in hose none is required. Again several patent *tannages* are used in some cases in belting, which are not used in any other class of leather goods. Thus as we claim, every argument favors the use of leather hose, as the most durable, reliable and cheapest, as well as the easiest, quickest and most reliable for firemen to handle.

The facts and evidence which we have adduced, must be conclusive to every unprejudiced person, that if the best article is

sought in fire hose, there can be no competition between leather and a cloth product, on the score of Safety and Economy, for it is at once seen that Leather, for a reserve hose to a department, is but an investment without deterioration.

If its duties are light, its deterioration or life is only in proportion to its use.

If its lot is for daily use, and its wearing qualities are exposed to constant abuse, leather is found to be unsurpassed.

Its strength is found to be more than double what is ever required for fire service.

The repairs on leather hose can easily, and cheaply, be made as good as any part, an economical consideration which no department can afford to overlook.

The ease with which it can be handled, with fourteen permanent handles to each 100 feet, gives it the preference over all other kinds. It can be abused for years and still be reliable, while, last but not least, its COST proves to be only about one-fifth that of any cloth or fabric product.

Its merits excel in every essential point, and are inferior in none.

There can be no good reason why fire departments should further experiment with fabric or cloth hose. It is a positive step backward. The fire service requires a substance which possesses strength and wearing qualities in the highest degree. Even the inventors themselves dare not use their own product. Suppose a teamster drawing several tons to a load was shown a woven or knitted cloth said to be ten times as strong as leather, and was asked to replace his leather harness for a cloth product, would not his own experience and intelligence tell him that he could not afford to put such substance into his harness as a gift? Even elephant's harnesses are made of leather, yet the inventors of cloth advise the use of their product in a fire department where strength and wearing qualities are of the utmost importance.

The "Western Fireman" of Jan. 10th, 1883, says—

"The efficiency of the light canvas, rubber-lined hose so much praised by Capt. Shaw, in use in London, was demonstrated at the recent great fire, about ten thousand feet of it was destroyed, most of it by bursting, when the large engines were brought to bear on it. Light fancy hose may do for hand engines and amateur firemen but when it comes to a fire, requiring a strong pressure and a solid stream, only the strongest kind of hose is reliable."

On this subject there has never been but one verdict from the Chief Engineers, when assembled in Convention. The last one was the Indiana State Convention, held at Shelbyville, May 7 and 8, 1882, in which the committee report unanimously as follows:—

"REPORT OF COMMITTEE ON HOSE.

THE BEST HOSE FOR FIRE DEPARTMENT USE, AND THE BEST HOSE TO BUY.

If a framer of the motion for this Committee had to repeat the motion we think the wording of it would be somewhat different. As it now reads it does not give the Committee quite the ground to work on that they would like, and it makes their report too positive. However, the committee will report what, in their judgment, is the best hose for Fire Department use, and the best hose to buy.

You are all aware that there are many different makes of hose to judge, and several kinds. This committee will first place them in two classes—Leather and Fabric Hose. We will next divide Fabric hose into three other classes, viz: Rubber, Cotton, and Linen. It is the opinion of this committee that the durability of Fabric hose may be safely placed as we name them above. Each kind and make has its advocates, and each manufacturer will tell you where and why his make of hose is superior to all others.

Leather hose is conceded by all to be the most durable. It will last for twenty years in fire service in any ordinary volunteer department of a city having from three to ten thousand inhabitants, where they seldom average over twelve fires in as many months. Many say they sweat and are dirty to handle. This committee fail to find any objection on that account, for we find no particular difference between taking up leather, cotton or linen hose, after they have been wet and lying in a dirty street, and we have taken up all three of them. There are makes of leather hose that are really nicer to handle than either rubber or cotton at fires. We refer to those having leather handles, some having as many as four to each section of fifty feet, making them easy to handle on a ladder or roof. Leather may be more apt to freeze than rubber or cotton, but it will not damage as quickly from sparks or heat, as it is always damp and a self-protector. It is a trifle lighter than rubber and a trifle heavier than cotton. If leather hose is oiled upon the inside (the proper place) instead of the outside, it will always be found as clean as any to handle. There is less stretch to it, and when bursted it can be repaired, while rubber or cotton are useless. For durability and economy we will recommend Leather Hose.

The durability of Rubber Hose does not exceed five years, and oftener not more than three, but we will call it from three to five years. After this age it cannot be trusted for fire service. In buying hose do not try and buy too cheap. You had better pay a fair price for a good article than a low price for an inferior article, which you are sure to get. The best is the cheapest, always. Rubber hose need less care than any other kind, for water will not hurt them as long as it does not get to the duck. They may be reeled up at the fire and left in that shape until they are used again, if they are kept from freezing. But when water gets to the duck, look out, for your hose will soon be useless. If you have never

noticed a section show blisters when under pressure, and watched how long it takes that section to become useless, let us tell you. The inside coating which is almost pure gum, has become damaged, perhaps a small hole which under pressure, expands, and the water finds its way between the rubber and the duck. When the pressure is taken off, this place will close and the water is left where it cannot get out, and you cannot dry it out, and in a few months your hose is useless. The acid contained in the sulphur used to vulcanize the rubber, will cause the hose to decay if they are not used, and stand on the reel all the time.

Cotton Hose, we all know, will not last above three, and oftener only two years in the average volunteer department that has any 'calls' to answer, as it must receive the best of care, which hose do not receive in many volunteer departments. It must never be reeled up to stand any length of time if damp, or it will mildew and rot. They tell us of a mildew and rot-proof cotton hose. It occurs to us that the man who discovers how to prevent cotton from mildewing has a fortune outside the hose business, in applying it to tents, awnings and sails. The same men tell us after we get their hose, that 'we must dry them without delay, or they will surely rot.'

Linen Hose has about the same faults in its make that is found in cotton.

FRICTION.

Many claim, and it is true, that water cannot be thrown as far through leather as through rubber or cotton hose, for in rubber and cotton the water-way is perfectly smooth, and there is nothing excepting the couplings to offer any resistance, while some makes of leather hose is greatly objected to on this account, as their water-way is obstructed by the full thickness of the leather all the way through; while others have been so improved that little or no resistance is made. In a test made by a member of this committee with the Akron Rubber Hose and Samuel Eastman & Co's Leather Hose, both attached to the same hydrant and under 80 pounds pressure, no difference was noticed.

Cost, of course, must be taken into consideration. Leather is the most expensive at first, as it costs more per foot than rubber or cotton. But when the question of durability is brought up, then is when it is placed on an equal with any of them. Two sections of cotton hose can be bought for the same money that will buy one of leather of the same length. But it will take two of rubber and three of cotton to last as long as the one of leather, all to receive the same care and use. After rubber and cotton hose are thrown out of fire service they are useless, while leather is worth ten cents per pound, or ten per cent. of its original cost, which places leather on about an equal footing with rubber on the purchase. Too many times the purchase of hose is left to councilmen or fire commissioners, who know nothing about it—probably never gave it a thought until called upon to buy hose for his department. How very quick

this want of hose will be found out by that noble army of men known as "hose agents," the most obliging set of fellows you can meet. They will surround these unfortunate men who are to buy hose, and in one or two days they will know all about hose if talking will do any good. Each one of these fellows, with his own well committed story about how long his hose will last, how much pressure it will stand, and how many testimonials he has from all the large cities, and many other points where it is superior to that of his neighbor. These buyers sometimes buy the choice of their chief and sometimes not, for he is very apt to select the best, and the average councilman will think it costs too much. Let us say here, that no city or town can afford to buy anything but the best fire apparatus all through, something they can depend on, for how long, during a fire, will it take to lose through poor hose and other poor apparatus, what a first-class outfit would cost. The chief is the man who should do the purchasing for the department, and care should be taken that in the selection of a chief they get the best qualified man to fill the position.

PRESSURE.

This same army of Hose agents come to us and boast how much pressure their hose will stand. Some will warrant 400 pounds, others 300 pounds, and so on. Who wants a section of hose after it has been tested to 400 pounds? Will any practical fireman tell us what he wants with 400 pounds pressure? He cannot do as much effective work on a fire with 400 pounds pressure as he can with 100. Where are your pumps or engines that are to furnish any such a pressure? This man wants to be asked how many pounds pressure he will warrant his hose to stand after it has been in use three years, if in fire service all that time. 'Oh, well,' he will say, 'you must not expect it to last always, we must live, you know.' If you can find a hose that will stand 120 pounds pressure in five years after you buy it, that is the hose to buy. How many of us use over from 70 to 120 pounds pressure? It is not necessary that the hose stand more than 130 pounds at the test. A test of 400 pounds signifies nothing to a practical fireman.

This Committee, for durability and economy, would recommend the purchase of Hose as follows: First—Leather. Second—Rubber. Third—Cotton.

Respectfully,
FRANK D. FINNEY,
A. B. CULVER,
FRED G. SHAW,
} Committee.'

We also quote from the proceedings of the Michigan State Firemen's Association, held at Detroit, Mich.

"We would now direct your attention to the next most important subject,—that of Hose.

The final issue of all the controversy which promised such satisfactory results in the beginning was, that personalities took the

place of argument, and we are left to our own surmises on this all-important subject. It is no practical use to firemen to know they have hose that will stand pressure of four or five hundred pounds. The object of a fireman is not to burst hose, but to do the best execution with the least possible chance of being so unfortunate. The idea of running hose pressure to 150 or 200 pounds, is now becoming as obsolete as used to be that of 'Hoop her up, boys,' on the old hand engines, when foremen used to '*take all the tuck*' out of the company at the commencement of a fire.

The durability of leather hose is a pretty well decided fact from the testimony of the Chief Engineers of the larger departments. From 15 to 20 years, good, reliable, honestly manufactured oak tanned leather hose will prove serviceable.

Your Committee now with fear and trembling approach the subject of Rubber Hose. We fear a visitation from that noble army of martyrs known as 'Hose Agents.' Has it ever struck the members of this convention the certainty with which they come around, if the fact has merely been hinted at, that new hose will be needed in your department? Self-sacrificing, and ready to immolate themselves on the altar of your requirements, they come not for their own advantage, nor their own gain, but simply to lay before you the unvarnished, but incontrovertable fact that their brand of hose is the very best, and that no department can possibly protract its existence unless amply supplied with this particular article. But does it become quite so agreeable to the departments *paying for it* when brought into competition with leather? Your Committee have closely examined the several reports of engineers on this subject, and come to the conclusion that the life of fabric does not extend beyond three years. No matter what care is bestowed upon it, or what service it has seen, whether it is put on the hose cart perfectly dry or rolled up as it comes from fire service, nothing seems to prolong its existence, and there seems some chemical reaction which destroys the strength of the fabric on which the strength of the hose depends. We desire to define the position we adopt as follows: That fabric hose, recently manufactured and subjected to a test of from 2 to 300 pounds pressure, will not, at the end of three years, stand any such test. From this it will readily be seen that, as a matter of economy, leather hose is by far the cheapest that fire departments can be furnished with, simply on account of its durability, for we believe that at the end of ten years, if properly cared for, it will stand as good a test as when first manufactured. We make all of our observations and deductions from the best articles of hose that the market furnishes. Leather possesses this advantage; that it can be repaired at a small outlay, whereas rubber has to be cut off or joined by some patent inventions got up for the occasion.

(Signed) DR. E. BATWELL,
(Signed) B. F. BRAZEE,
(Signed) CHARLES ANIBA,
(Signed) H. J. DRAKE,
(Signed) DAN. W. SAWYER,
Committee."

Subsequent Conventions have reported they could add nothing to the foregoing report, it being full and complete.

The last report of the committee on hose adopted by the New York State Fireman's Association was held in Ithaca, and reads as follows:

"*To the Firemen's Association of the State of New York.*

Gentlemen: The Committee on topic No. 8 ('which is the best kind of hose?') beg leave to respectfully report as follows:

That in their opinion, drawn from a careful and practical consideration of the important subject, THE BEST LEATHER HOSE is in every respect THE BEST HOSE for all fire department purposes.

Your committee are led to this unbiassed view by the following well established facts:

That it will last fully THREE TIMES AS LONG as the best fabric hose. Therefore, being by all odds the MOST DURABLE and RELIABLE, it will be found greatly MORE ECONOMICAL in the long run.

That while it is virtually impossible to properly and reliably repair fabric hose, leather, by a slight expense, can be made entirely serviceable again in the event of a break.

That leather is more easily cared for, not requiring oiling more than twice a year at the farthest, and no such danger need be apprehended from rotting, as in the case of fabric hose, which is liable to decay by reason of the very nature of rubber.

That leather hose will stand better continuous legitimate water pressure at fires than fabric.

That leather is fast becoming THE STANDARD HOSE in all efficient and well-managed fire departments in the country, and is indorsed and recommended by all the best chief-engineers and other practical firemen.

Therefore, on the score of economy and durability, and believing that it presents the most reliable and approved medium of extinguishing fires, your committee unhesitatingly indorse leather, and recommend its use by departments now using fabric hose.

All of which is respectfully submitted.

(Signed) R. S. CALKINS,
(Signed) R. T. DICK,
(Signed) T. H. BEAL,
Committee."

THE BEST HOSE.

That there is a growing sentiment in favor of hose which unites in proper ratio *all* necessary qualities, is manifest. On this subject the *National Fireman's Journal,* expresses itself editorially as follows:

"The requisites for good hose are strength, lightness, and durability. Hose may possess the first two of these qualities in an eminent degree, yet, lacking the latter, be comparatively valueless. It

may be much of the material, which, when new, contains within itself the seeds of its own destruction, and consequently become utterly useless after one or two years service. Lightness is required in order that it may be readily handled, carried up high ladders, and otherwise taken about by a small number of men. Some manufacturers lay quite a stress upon the fact that their hose will sustain a pressure of six or eight hundred pounds to the square inch, and give exhibitions of such tests to admiring committee-men, who are likely to become purchasers. Now, if some of that original strength can be converted into durability, a much more satisfactory hose will be the result. Hose is seldom subjected to a pressure which exceeds one hundred pounds to the square inch. In most departments, engineers of steamers are prohibited from carrying over one hundred pounds without an express order from the chief, who is careful to give it only in cases of great emergency. Hose, therefore, that will resist a pressure of two hundred pounds, is just as good for fire purposes—all other things being equal—as hose that will sustain a pressure several times greater.

If it will sustain two hundred pounds for five or six years, it is, of course, much more serviceable and economical than that hose which will sustain three times that pressure half that length of time. It is, therefore, all nonsense to exact high tests of hose. Would-be purchasers should rather consider whether the material of which it is composed is likely to resist, for a long time, the wear and tear of hard service, and still retain its capacity to sustain one or two hundred pounds of water pressure. The hose that will do this the longest is the most economical hose to buy."

The *Fire Record* says, editorially,—

"What the firemen should have in their hands is, hose that is reliable and durable. It is not so important that the hose, when new, should stand a pressure of from 400 to 750 or more pounds to the square inch, as it is, that, when once put into the fire department for use, it will stand the test of severe duty, and can be depended upon as safe, durable, and economical. Leather hose, when properly made and the best material used, has proved to be the most durable hose now before the public. Leather hose is in use to-day, in many of the large cities, that we know has seen fifteen years' service, that can be relied upon at any time it is called into use, and from all appearances is good for many years to come."

PRESSURE.

Strange as it may seem to some, pressure above a certain point produces a result the very opposite of that intended. Science tells us that an increase of pressure means simply an increase of velocity, and that the resistance of the air to a jet is in proportion to the square of its velocity. Such is the nature of water, that the instant its velocity is increased it meets an added resistance of the

air, and begin to "strip," or, in the fireman's vernacular, "tear itself to pieces."

This fact appears in an admirable treatise on "Fire Streams," by George A. Ellis, of Springfield, Mass., a work based on experiments made by Chief Engineer A. P. Leshure, of the fire department of that city. That our position on this matter may be fully fortified, we quote the conclusions of this author. He says,—

"From a careful study of these experiments, I am led to the belief that each size jet is capable of being forced a given distance horizontally, and cannot, by any pressure at the nozzle, be made to go further."

As to the effect of increased pressure, he says,—

"But water, not being a solid, but composed of an infinite number of particles that move with great freedom among themselves, the instant its velocity is increased, it meets with an added resistance from the air, and begins to strip sooner; it lacks coherence, and, having been previously taxed to its utmost to reach the end, now, in spite of increased quantity of water, finds itself unable to hold together, and thus takes advantage of its added weight, or, as firemen express it, 'tears itself to pieces,' and fails to reach the same distance as under 50 pounds less pressure."

As there are cases where fire streams are required under unfavorable conditions, as regards pressure, we quote from the *Fireman's Journal*, No. 32, giving an account of a celebration of the event of the introduction of the "Holly system," into Burlington, Iowa.

"The source of supply and the location of the pumps are 2 1-2 miles from the city; and the location of the most extreme hydrant is 175 feet above the level of the pumps. At a preliminary trial of the works, on April 29, the six streams were thrown an average height of 112 feet, the spray therefrom reaching considerably higher, or nearly 300 feet above the level of the pump-house. At the test above given, the water pressure was 175 pounds at the pumps."

In the *National Fireman's Journal* will be found an extract from the New York *Herald*, describing a plan proposed by a hydraulic engineer of that city, for protection from fire, the introduction of which would supersede the use of steam fire-engines. This plan, which is pronounced by Mr. William J. McAlpine, builder of the Chicago Water-Works, as the best that could be devised, proposes a tower of 300 feet, or about twice the height of the tallest building in the city. Here we have but 130 pounds' water pressure, and yet it is held to be sufficient for service among the tallest buildings in the largest city of this continent.

STEADY PRESSURE.

Our best and most experienced firemen in our largest cities have come to the conclusion that what is wanted for the most effective fire service is a steady pressure. Their experience has shown that high pressures are not the most available. They are apt to be unequally maintained; the stream is more difficult for the pipemen to manage, rendering them more liable to accident by being forced from ladders and like perilous places. A steady, intermittent, and persistent fight with the flames is the surest and quickest road to their annihilation.

HEAD AND PRESSURE.

In determining the discharge of water under pressure, all calculations are based on the depth of water above the outlet, which is usually stated in feet. As a column of water, at 61° Fahrenheit, an inch square, and 2.31–|– feet high, weighs one pound, it represents on the pressure gauge the unit of water pressure. Multiplying any pressure, therefore, by 2.31 gives the head in feet for that pressure; and, conversely, dividing any head or depth of water above the outlet by 2.31 gives its equivalent in pounds' pressure. The annexed table will show the reader the approximate effectability of reservoirs, and serve to overthrow the fallacy of immense pressures. It will be seen that a pressure of 300 pounds represents a column of water over an eighth of a mile high; and one hundred pounds requires a reservoir higher than Bunker Hill Monument.

HEAD.		HEAD.		HEAD.		HEAD.	
Lbs.	Feet.	Lbs.	Feet.	Lbs.	Feet.	Lbs.	Feet.
15	34 66	80	184 85	190	439 01	500	1155 29
20	46 21	85	196 40	200	462 11	525	1213 05
25	57 76	90	207 95	225	519 87	550	1270 82
30	69 32	95	219 51	250	577 64	575	1328 58
35	80 87	100	231 06	275	635 40	600	1386 35
40	92 42	110	254 17	300	693 17	625	1444 11
45	103 98	120	277 27	325	750 93	650	1501 88
50	115 53	130	300 38	350	808 70	675	1559 64
55	127 08	140	323 48	375	866 46	700	1617 41
60	138 64	150	346 59	400	924 23	725	1675 17
65	150 19	160	369 69	425	981 99	750	1732 94
70	161 74	170	392 80	450	1039 76	775	1790 70
75	173 29	180	415 90	475	1097 52	800	1848 47

TESTING HOSE.

The right of individuals and communities, to satisfy themselves that their purchases are up to the representations of the seller, is inherent, and should always be intelligently and judiciously exercised; but it is a mistaken and unwise policy which has established the custom of over-straining fire hose under a pretence of testing it. It is not only a right, but a duty, for each and every one to see that he gets his money's worth, and that whatever he buys is up to the standard of the service required of it. The exercise of this right can, however, be carried to an extent resulting in positive injury to the article tested, and gross injustice to the seller. To realize the correctness of this proposition requires only an application of plain common-sense. Though it is right and proper for purchasers of fire hose to see that the article they have bought comes up to the representations of the manufacturer, and to the requisites of *actual fire service*, tests are often indulged which we would not for a moment think of applying to any other article with similar severity. Test the strength and reliability of a wagon with methods the same in spirit and character as are frequently applied to fire hose, and we become, in the opinion of sensible men, candidates for a lunatic asylum. The maker of the wagon has represented that it will sustain a certain weight, and, with proper care, last a specified number of years. Now, if you treat it as if it were fire hose, you load it with the exact weight mentioned, and then start on a trip "across lots," through the pasture. Should it stand this, you then try it on the smoother highway, constantly increasing its burden, however, to determine at just what point it is going to break down. The result of such a test is, of course, a ruined wagon.

Since the introduction of Steam Fire Engines, ninety per cent of all the leather hose has been subjected to frequent and severe tests to the utmost capacity of the Steamer, simply to only gratify idle curiosity. Still in nearly every instance it has withstood such abuse. The nature of leather is such that it cannot be rent or bursted until after its elasticity and fibre has been strained to its utmost capacity. This elasticity should be retained in the leather, for then its bursting capacity can only be reached in fire duty after it has been worn or chafed through by use, or by some overlooked defect in its manufacture, which very seldom occurs.

As the strength of Leather Hose is about three times that which is required for fire duty it seems useless to try to rob it of any of

its usefulness, and we are pleased to see that this practice is now fast becoming extinct in our best regulated fire departments.

Conduct a fire hose test in a manner commensurate with the service you expect of it, and you then treat it as you do anything else that is valuable and necessary.

That the reader may have other authority than our own on this subject, we present the opinion of the *National Fireman's Journal*. The editor of that paper gives his ideas on this matter, of testing hose, in the following clear and concise article:

"In dealing with the hose question in these days when competition in that particular article runs so high, great stress is laid by manufacturers and purchasers upon the amount of pressure which any given sample of hose will resist. Some manufacturers will claim that their hose will resist a pressure of from four to seven hundred pounds. In a previous article we showed that such pressure is never applied, and consequently such resisting capacity not required. It is seldom that a pressure exceeding 100 pounds is applied to hose in actual service, and if it is made to resist 200 pounds it will do all that ordinary service will require. In the principal fire departments, an engineer is not permitted to carry more than 100 pounds' pressure without the special order of the chief. Instead of such great resisting power at the outset, what is wanted is greater durability and lightness. Hose is frequently subjected to too much pressure in testing it, whereby its future usefulness is impaired. When hose is tested to its full capacity, every fibre in it is subjected to a severe strain, and it never recovers its elasticity. It is claimed that a severe test of this kind destroys one half the life of the hose; and it not unfrequently happens that hose so treated gives out very soon when put into actual service, notwithstanding it has resisted the heavy pressure of the testing operation. The fact that hose, when new and fresh from the manufacturers' hands, will resist 400 or 500 pounds, is no proof that it is durable and will stand hard service. "The severe test to which it has been subjected may have been the very means of destroying its usefulness.

It is not deemed prudent to strain the hose and rob it of its elasticity and its life by a test applied to gratify curiosity, and which is unnecessary. Let us have good, serviceable hose, combining lightness with durability, and dispense with this useless talk about its resisting extravagant and unnecessary pressure."

"HIP-BONE" PLACES.

Sometimes in leather hose may be found places which have an enlarged appearance termed a "hip-bone," and are always, if at all, about a foot from the butt end of a strip of leather. In long lines of hose such places may be occasionally found. They are caused by a very prominent hip-bone in the ox from whom the hide was taken. In such hides it is sometimes almost impossible to remove

all of the loose leather, so but what when it is subjected to pressure it gets slightly into its original shape. Some might think that such spots indicate weakness, and consequently endeavor to burst them. That these are weak places is an erroneous idea, for they will be found the last to give way. The explanation is made, that really good and perfect hose may not be ruined by vain attempts to burst a "hip-bone" place.

ELONGATION.

Speaking of a fire hose test failure the *Fireman's Journal* says:

"At the United States Chief Engineer's Convention, held at Cincinnati in September, 1882, a Committee was appointed to test the different kinds of linen and cotton hose. A pressure of 300 lbs. was applied to one section, under which it stretched *eight* feet. At this point the Committee announced that it would not proceed further with the test, and the pressure was removed from the hose."

Also at a public test of the three kinds of Fabric Hose at Newburyport, Mass., they stretched or elongated respectively 40 inches, 56 inches, and 8 feet 10 inches, to each section.

To prove that the elongation under pressure, of fabric hose, cracks the rubber lining we quote from the *National Fireman's Journal* in a report of an experiment made at Westfield, Mass:

"One length of Blake hose, 51 feet 9 inches, stretched 5 feet 10 inches under 127 pounds' pressure.

"One length of 'Paragon,' 48 feet 6 inches, stretched 4 feet 11 inches.

"One length of 'American' hose, 49 feet 2 inches, stretched 1 foot 11 inches.

"One length ditto, 50 feet 9 inches, stretched 1 foot 7 inches."

On this subject a prominent fabric hose circular says:

The tendency of such excessive stretch is to detach the rubber from the hose, and ultimately to cause it to leak, while a worse effect is so great an amount of contraction when the engine stops as almost to pull a man off a ladder.

Leather hose will not elongate when under pressure, but lays still.

OLD FOGYISM.

Though the foregoing facts in regard to the qualities of leather hose cannot be successfully met by fair argument, they are, however, assailed with sneers, insinuations, and false though plausible statements. But the light of truth dispels them, and exposes the weak sophistries with which the advocates of fabric hose maintain its super-excellence.

The disciples of leather hose are met at the very threshold of discussion with the sneer of old fogyism, and the insinuation that the use of leather belongs to the days of pod-augers. This does not approach the dignity of an argument, but it serves the intended purpose of conveying the impression of bigoted opposition to improvements, and deserves to be stamped out, that the over credulous may not be deceived. It is true, that the use of leather is something ancient. But what does that fact signify against its merits? The world itself is older still, yet none of us are over-anxious to leave it for more progressive spheres. The world that felt the tread of Cæsar's conquering armies, and witnessed the rise and decline of the mighty Roman Empire, is just as welcome and necessary to the achievements of the nineteenth century. That man, in these days of progress and invention, retains the use of leather, is simply because *nothing has yet been discovered to excel it*. Remember, that the stamp of age does not always mean inefficiency and incompetency, for even with our boasted civilization, we should gladly welcome the resurrection of the "lost arts" that centuries have buried in oblivion. It happens, however, that leather, old as it is, still retains its place in the esteem of man, for it is intelligence, and not "old fogyism," that clings to its use. Now, if progress means the endorsement of shoddyism, on account of some fleeting fashion of the day, and the substitution of the unreliable for that which had stood the test of time and fulfils every requirement, we are not, nor do we desire to be, progressive; but if, as is the fact, progress means the most intelligent use of the best-attested results of science and art, then we submit that we can fully claim to be progressive. We most assuredly believe in and endeavor to be up with the most approved modern ideas, and are only too willing to embrace every innovation that can be shown to be of practical utility in excess of that which it seeks to displace. In maintaining the excellence of leather as against patent substitutes, we submit to every candid mind that we are taking no step backward, but are really in the front rank in the "march of improvement."

PATENTS.

Of the numberless kinds of cloth hose that have from time to time been put before the public, they are now sifted down to about a half dozen, all of very recent date. The many which have dropped out of notice on account of their worthlessness, have been absorbed by the remainder. This lapping of one patent on to another should not deceive any one as to the time any particular fabric or cloth hose has been in service. Cases have occurred where the representations made by the manufacturers, were so ambiguous that the impression was created that the hose was in service several years prior to its invention, with a large array of figures as to its economy, in New York and Boston, over other kinds, without giving the date when either kind went into service.

EXPERIMENTS.

After a quarter of a century of experiments in fabric patents to supplant the use of the old reliable leather for fire service without satisfactory results, is it not about time that these patent-rights men diverted their field of action, and ceased their experiments where millions upon millions of property, and the lives of trusting citizens, and those of the noble firemen as well, are endangered? Certainly, here is the last place for that which is cheap and unreliable.

Says the Daily *Bulletin*, of New York city, on the subject of fire hose:

"Millions of dollars per annum might be saved to the insurance companies and the country if fire commissioners, chief engineers, and insurance officers would combine to demand that only the very best hose should be supplied to the firemen of every city and town. The purchase of any other kind is not merely a waste of the purchase-money, but a fraud upon property-owners, tax-payers, and insurance companies, and an outrage upon the firemen themselves, whose brave efforts are made null and void."

After the recent large fire in Boston the *Journal* said:

"Steamers 4 and 6 were used until late in the evening to pump out the flooded basement. It was noticed at this, as at other large fires recently, that a large quantity of hose burst while in use. It appears that the department is in need of a better article."

FREEZING.

It is hardly of sufficient importance, but as the objection is sometimes raised against leather hose, it might be well to answer it. The fact is, leather hose suffers less from low temperature than any other kind. While it is true that extreme cold may delay the work of firemen, leather hose by no means increases the hindrance. It fulfils its duty at such times as well as its rivals, while it entirely escapes all injury to the leather. The effect of frost on leather is to increase its pliability, and it is a practice, when leather is required to be exceedingly pliable, to expose the sides to the freezing process. From this fact it is plainly seen that leather hose is far more able safely to withstand the cold than any of its fabric competitors.

OUR HOSE.

The careful and candid reader, who has followed us thus far, cannot but be persuaded that we have completely made out our assumption for leather, and it therefore only remains for us to assure him, that, upon the material and manufacture of leather hose depends entirely its ability to fulfil all that we have claimed for it. This only requires that we point to the lessons taught by experience. Oak-tanned leather is the only article that will stand every test, and as to the manufacture, the enviable reputation our hose has attained in the past quarter of a century in every section of the country, North, South, East, and West, affording abundant proofs of durability and reliability equally well in all climates, hardly renders it necessary for us to say much in regard to it; but, for the benefit of those, who, in the wild rush of experiment in the multitude of fabric patents, have had no opportunity to test its claims, we will here present them, with a description of its manufacture, which is the true source of its approved merit.

A selection is made from the best "Slaughter ox" hides, free and perfect from all cuts and brands. It is tanned by the best Oak bark, upper leather and cold liquor process, so called, which gives it that same pliability as a calf skin, and would be as pliable if no thicker. This is what imparts to our hose the durability, pliability and strength for which it is so justly celebrated.

In currying our stock we use nothing but the best oil and tallow and warrant it never to fry or stew out. In riveting, we use a heavy copper rivet and bur manufactured especially for us, coated with tin, and being extra heavy is adapted to very rough and hard usage so that when run over by teams it is seldom affected. The riveting is complete in its workmanship,

and is finished with a smooth, round head. In putting our Standard Hose together, we have so improved its water way, that it will conduct water with less friction than any other hose in existence. Our long experience and large manufacture of leather hose has been of incalculable advantage to us in keeping in the front ranks of all modern improvements. As to couplings we attach any kind wanted. If no instructions are given we complete it with the best and most approved Standard Screw Coupling with thread cut to match that of the department for which it is intended. Our couplings are finished in the best manner and nickel plated. We mark or engrave couplings, if wanted, with name of Co. or city, without extra charge and also put in a set of coupling tools, with orders of five hundred feet and over.

We have seven permanent handles on each fifty foot section of our hose, which make it the easiest, quickest and best to handle in existence.

We now ship our Standard hose fresh oiled on inside, so that in ordinary departments it is complete for several years use without further expense. The best way to now oil leather hose is to put a light coat on the inside when needed, at a cost of 30 to 40 cents per 100 feet for labor and oil, or $3.00 to $4.00 for 1000 feet. This is done with our *inside hose oiler* which always keeps the hose on the outside clean and in good condition. If frequently used it seldom requires oiling and then oil should never be used in excess.

Our hose will be found in every section of our land. In the best Fire Departments, Iron and Steel works, lumber mills, Agricultural manufactories, public buildings, hotels, theatres, markets, factories, mines, railroads and steamships; but wherever it may be met we invite the closest scrutiny of its record.

To any Departments that may favor us with their orders, we guarantee to faithfully fulfil every claim we make for our Standard Hose. The quality of the stock and workmanship shall be of the finest grade possible. We warrant all our hose to be perfectly reliable with a direct head of four hundred feet, and our Standard Hose for five hundred feet head. On the reel our hose takes up for space, about a medium between the different kinds, or about 100 feet more can be carried than rubber, and perhaps 100 feet less than some of the makes of fabric, or cloth hose.

Our prices will at all times be kept as low as the cost to manufacture will admit; but, under no circumstances shall we reduce our prices by impairing the *Standard quality and true value* of our hose.

CONCLUSION.

In conclusion let us extend to our many patrons and friends, in every section, our most cordial thanks for bestowing upon us your highest endorsements for all our claims. Your many letters of congratulation on the success of our hose, (we fully appreciate their value) shall ever be held as the best mementos you could bestow on us. In the future as in the past we pledge our honor that we will spare no cost in adapting our hose to the best needs of the fire service, and that you can always look back with pride on our hose as the most economical and valuable acquisition that your fire department could possess. To those who hold the important trust to purchase for your communities and property owners, their fire hose, your selection of the best cannot be over-estimated as a purchase in almost every instance is to cover a period of twenty years or more. On this subject your mind should not be diverted from the true issue, to inferior substances, which, when combined together for fire hose, is certain and quick destruction. After a full consideration of the facts and deductions which have been set forth it must be evident to every unprejudiced mind that there can be no substitute which has yet been discovered that can fill every important requisite equal to leather and copper for our modern fire hose. We might here go on and insert numberless testimonials both as to the excellence of our hose and its comparative value. These seem to be unnecessary.

We believe your verdict must be unanimous for leather. As you have but two kinds to select from, and but two substances composing each kind, your task is not a difficult one. The true value of the substances used in either kind are well known to every person in every hamlet in our land.

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